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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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James A. LaBarre  
BURNS, DOANE, SWECKER & MATHIS, L.L.P.  
P.O. Box 1404  
Alexandria, VA 22313-1404

EXAMINER

KIKNADZE, IRAKLI

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/004,785

Applicant(s)

BOWEN ET AL.

Examiner

Irakli Kiknadze

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 11-16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or  
 (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1, 5 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsushita et al. (US Patent 6,320,655 B1).

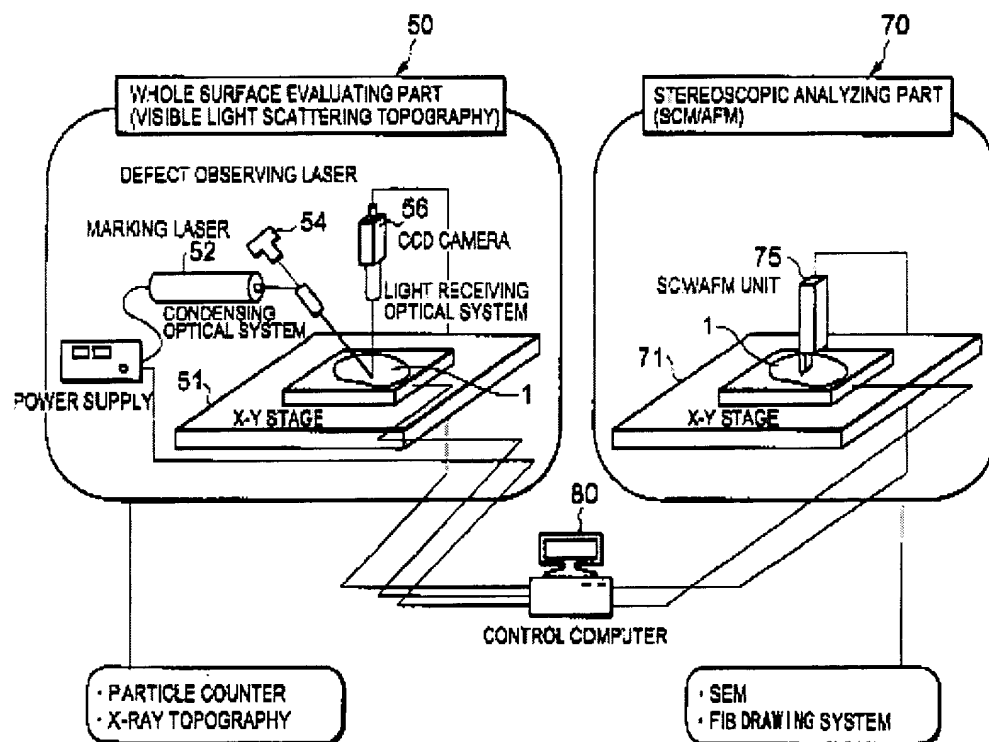


Fig. 15

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With respect to claim 1, Matsushita discloses (Fig.15) an X-ray topographic system comprising: an X-ray generator (54) for producing a beam of X-rays directed towards a sample (1) location; and a detector (56) positioned to receive X-rays deflected by a sample (1) at the sample location, the detector (56) comprising an electronic X-ray detector having an array of pixels corresponding to the beam area at the detector (56).

With respect to claims 5 and 10, Matsushita discloses that the detector (56) is positioned to receive deflected X-rays reflected from the sample (1). The detector (56) is a charge coupled device (CCD) (see Fig.15).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 6 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. (US Patent 6,320,655 B1) in view of Arndt et al. (WO 98/13853).

With respect to claim 2, 6 and 7, Matsushita generally shows all elements except disclosing that: the X-ray beam has divergence up to 20 milliradians; the X-ray generator is adapted to produce a source spot size of 100  $\mu\text{m}$  or less and has an exit window less than 20 mm from the target; and the system resolution is about 25  $\mu\text{m}$  and

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the detector is located 5 - 10 mm from the sample location. Arndt discloses an X-ray generator having all these parameters disclosed above (column 10, line 1 – column 11, line 14). It would have been obvious to one ordinary skill in the art at the time invention was made to employ Arndt's X-ray generator in Matsushita's topography system, since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

5. Claims 3, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. (US Patent 6,320,655 B1) in view of Hossain et al. (US Patent 5,754,620).

With respect to claim 3, 8 and 8, Matsushita generally shows all elements except disclosing an X-ray optic interposed between the X-ray generator (54) and the sample (1) location, and arranged to receive said beam and to transmit the X-rays as a substantially parallel beam. Hossain discloses an X-ray topography system comprising an X-ray optic (122) interposed between the X-ray generator (120) and the sample (138) location, and arranged to receive a beam (144) and to transmit the X-rays as a substantially parallel beam (145), allowing for better overall quantitative analyses of the sample (138)(Fig. 6; column 15, line 59 – column 16, line 47). It would have been obvious to one ordinary skill in art at the time invention was made to provide the X-ray topography system of Matsushita with the X-ray optics of Hossain, in order to provide better overall quantitative analyses of the sample.

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Further, With respect to claims 8 and 9, Hossain discloses that the X-ray optic (122) comprising a number of parallel, X-ray reflective plates, a structure made up of many alternating layers of heavy and light elements. The heavy layers obviously can be coated from heavy and excellent X-ray beam reflector material gold. It would have been obvious to one having ordinary skill in art at the time the invention was made to provide the X-ray optic comprising a number of parallel, X-ray reflective plates coated with gold for Matsushita's topography system, since it has been held to be obvious within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. In re Leshin, 125 USPQ 416.

6. Claim 4 as rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. (US Patent 6,320,655 B1) in view of Piwczyk (US Patent 3,716,712).

With respect to claim 4, Matsushita shows that the detector (56) is positioned to receive deflected X-rays reflected from the sample (1) but fails to disclose a system in which a detector is positioned to receive deflected X-rays transmitted through a sample. Piwczyk discloses (Fig.2) X-ray topography system in which a detector (32) is positioned to receive deflected X-rays transmitted through a sample mounted on the carrier (23) (column 4; lines 15-56) allowing making X-ray topography of thin wafer.

It would have been obvious to one ordinary skill in art at the time invention was made to provide the topography system in which a detector is positioned to receive deflected X-rays transmitted through a sample as taught by Piwczyk, since as stated at

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column 2, lines 17-22 that such modification would to improve multiplicity of the topographic system and allow producing X-ray topography of thin single-crystal wafer.

### ***Allowable Subject Matter***

7. Claims 11-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: With respect to claims 11-16 prior art fails to disclose or make obvious an X-ray topographic apparatus comprising stepping means for producing relative stepwise motion between an X-ray topographic system and a sample to be inspected, the step size being a function of the beam area, and image processing means for reading out the pixel data of a detector between successive steps.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kikuchi et al. (US Patent 6,072,854), Beard, Jr. et al. (US Patent 4,928,294) and Hartmann et al. (US Patent 3,982,127) discloses X-ray topography methods and apparatus.


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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is (703) 305-6464. The examiner can normally be reached on M-F(8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Irakli Kiknadze  
January 16, 2003

  
ROBERT H. KIM  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800